

**CHUM SALMON GENETIC STOCK IDENTIFICATION;
1994 SOUTH ALASKA PENINSULA FISHERY SAMPLE COLLECTION**

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David R. Sarafin

Regional Information Report¹ No. 5J95-10

Alaska Department of Fish And Game
Commercial Fisheries Management and Development Division
333 Raspberry Road
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February, 1995

¹The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished division reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Commercial Fisheries Management and Development Division.

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INTRODUCTION

Concerns regarding the interception of migrant chum salmon (*Oncorhynchus keta*) within the South Unimak and Shumagin Islands June sockeye salmon (*O. nerka*) fisheries of the South Alaska Peninsula Management Area, Area M (Figure 1) have long been at issue (McCullough et al. 1994). There remains a need for scientific evidence which evaluates the extent and nature of this interception. The Alaska Department of Fish and Game (ADF&G) is presently incorporating genetic stock identification (GSI) techniques to examine the composition of the chum salmon stocks involved.

The Department has collected GSI tissues of the commercial chum salmon catch of the Area M June sockeye fisheries throughout the 1993 and 1994 seasons. The 1993 sampling was conducted as a pilot study sampling the catch of the South Unimak fishery only (Sarafin et al. 1995). Effort was increased in 1994 to sample both the South Unimak and the Shumagin Islands fisheries. In addition, pre-season test fish catches were sampled from both areas. This report summarizes the GSI sampling throughout the June 1994 season.

The 1994 fishery began with a late start. Early test fish catches had low sockeye salmon to chum salmon ratios, indicating a relatively high abundance of chum salmon in the area. This caused the opening to be delayed until 17 June. The fishery was then open every day until 30 June (hours and sections of open fishing varied by day). The 1994 fishery produced a relatively low catch of sockeye salmon, and the chum salmon cap was not reached.

OBJECTIVES

Planning for the 1994 season was conducted throughout the winter and spring of 1994. During this time, there was uncertainty regarding management decisions affecting the June fishery, specifically, the possibility of the existing chum salmon cap of 700,000 fish being reduced to a much lower number. Subsequently, planning was based on the assumption that the fishery could occur for only a few days. Initial target sample sizes of 400 fish/day for each area during the actual fishery were established to assure that sample collections adequate for GSI analysis were obtained.

Pre- and post-season test fishing was proposed to provide sampling opportunities throughout the entire traditional time period of the fishery, roughly June 10-30. Each test fish sample collection would consist of 300 individuals from the days catch and would be replicated once on successive days to test temporal stability of GSI estimates. Pre-season test fish sampling would begin approximately June 9; post-season sampling would be separated by one week intervals and would terminate at least by the end of the first week of July.

METHODS

Sampling was conducted at processing plants located in King Cove and Sand Point. ADF&G crews arrived June 8-11 and remained at each of these locations throughout June. Fish were sampled from tender deliveries to the plants. Tender operators were interviewed at the time of delivery to determine the origin of catch. Attempts were made to sample proportionally to that days overall catch by area. Methods of determining tender loads to sample varied slightly between the two sampling locations. These are described in the specifics by location that follow.

Test fish samples originated from one seiner in the vicinity of the Shumagin Islands and one in the South Unimak area, each operating in traditional areas of the commercial fleet. Sampling was conducted in conjunction with the pre-existing test fish program in the Shumagin Islands (McCullough et al. 1994). A similiar operation was established during 1994 in the South Unimak area to provide GSI samples and to provide additional sockeye/chum ratio information for management decisions.

Tissue samples were collected following the techniques described in the instructions "Collection of Finfish Genetic Samples" (ADF&G Genetics Laboratory 1994). The sampling was conducted as a production style operation with each dissector responsible for obtaining all four tissues involved: liver, heart, muscle, and eye. Muscle tissue was collected from skeletal muscle dorsal of the lateral line and at the edge of where the 'head chop' occurs, a location selected to minimize any damage to the plant's product.

King Cove

Sampling followed 1993 procedures (Sarafin et al. 1995). The sampling station was located at the head of the sorting line inside the plant, fish were taken at random from the line as they were off-loaded from tenders. Crew size ranged from 2-3 person. Typically, two people would be dissecting while the other would provide supplies and care for samples.

Tender delivery schedules/tally sheets were provided by the processing plant. These schedules are derived from regularly scheduled radio communication with the plant's fleet and inform of anticipated deliveries to the plant throughout the day; providing name's of tender's, predicted time of delivery, origin of catch, and weights of catch by species. This schedule is the primary source of information for determining the crew's sampling schedule. Loads were selected for sampling each day in a manner to proportionally represent each of the various localities of catch. Numbers to sample from each load were determined proportionally by estimated weight of chum salmon catch for each of the areas. A sampling log was kept, recording for each sample: the date and time of delivery, tender name, origin of catch, and estimated total weight of chum salmon in the load.

Sand Point

Sampling was conducted on the docks of the processing plant. Samples were taken from totes of chum salmon which had been sorted by species from the selected tender's load. Crew size ranged from two to four persons. Each person functioned as a dissector.

To determine sampling schedule, the crew routinely requested information from plant personnel regarding times of expected tender deliveries. Each day, deliveries were targeted for sampling with attempts to proportionally represent each locality of catch. When possible, numbers to sample from each load were determined proportionally by estimated weight of chum salmon catch for each of the areas. A sampling log was kept, recording by sample the date/time of delivery, tender name, origin of catch, and estimated total weight of chum salmon in the load.

RESULTS AND DISCUSSION

A total of 6290 chum salmon were sampled during this project; 2850 from the South Unimak area catch and 3440 from the Shumagin Islands area catch (Table 1). Samples were preserved on site in walk-in or chest freezers, shipped to Anchorage on dry ice, and stored in -80°C freezers, where they remain in archive at the ADF&G genetics laboratory in Anchorage.

Pre-season test fish samples were obtained from each area. As the first opening approached, the 700,000 fish chum salmon cap remained in effect. The original sampling goal of 400 fish per day from each area was reduced to 200 since the fisheries were likely to last more than just a few days and thus provide ample opportunity for GSI sampling purposes. By June 25, the daily goal was reduced to 100 per day for each area. Since the fisheries continued until the end of June and since more samples than necessary were acquired, post-season sampling was not performed.

Actual sampling went smoothly. Crew's became efficient at the rapid sampling techniques involved. In mixed stock GSI sampling it is vital for all four tissues obtained, which are placed into four separate vials, to correspond to each other by each individual fish. Having each dissector be responsible for obtaining all four tissues from each individual fish is a measure to reduce the possibility of sampling errors occurring.

Catches delivered to the King Cove plant were predominately of South Unimak origin while those to Sand Point were of Shumagin fish. Occasionally, tenders with Shumagin fish also deliver at King Cove. Deliveries also went to floating processors located at King Cove. These were not sampled due to the logistical complications involved and the suitable number of fish arriving at the shore-based plant.

King Cove

Of the total 2850 chum salmon sampled of the South Unimak area, all were sampled from tender deliveries to the King Cove processing plant. Samples by date of sampling and by estimated date of catch are shown in Table 2. In addition to these samples, 140 of the Shumagin Islands area samples were obtained from deliveries to King Cove.

The test fish catches of the South Unimak area were sampled from 13-16 June. The catch of only one of these four days, 13 June, produced enough chum salmon for the daily sampling goal of 300. Because of the distance involved to the fishing grounds of this area, catches were not brought daily to King Cove. Instead, a tender brought in a load from the combined catches of 13 and 14 June and then a second combined load from 15 and 16 June. These loads were sampled on board floating processors at King Cove. Since daily catches were insufficient for sampling goals, and since daily loads were not separated at the time of sampling, daily temporal stability of these catches can not be examined as planned.

The sampling setup at the plant was slightly cramped, but satisfactory. Two other sampling crews, both taking AWL data, work in the same general area. Congestion does inhibit the rate of sampling.

The daily sampling itinerary was determined from the plant's posted tender delivery schedules. These schedules are a convenience for crew scheduling along with being vital to attempts at sampling in a manner representative of the fishery.

Sand Point

A total of 3440 chum were sampled from catches of the Shumagin Islands area. Deliveries to the Sand Point plant produced 3300 of these, while 140 samples were taken from Shumagin deliveries to King Cove. Table 3 shows number of samples by date of sampling and by estimated date of catch.

The established test fish program at Sand Point was quite conducive to GSI sampling. The desired goal of 300 samples per day was achieved on each day of sampling. Paired sampling's occurred 9,10 June and 13,14 June. In addition, samples were obtained from the test catch of 17 June from within 24 hours of the first commercial fishing of the Shumagin.

The sampling setup was quite satisfactory. The work station had plenty of room for four dissectors. The fish totes from which samples were taken had been sorted solely by species and should represent a random sampling of the tender's mixed load.

The sampling schedule was difficult to determine. Deliveries to the plant are not in an organized, scheduled fashion. Information provided by plant personnel was quite helpful in selecting loads to sample in a representative manner. However, the crew did have some difficulties anticipating times and number of deliveries throughout the day.

RECOMMENDATIONS

A sampling design similiar to this season's should be appropriate for the 1995 season. As data become available from analysis of the 1993 and 1994 collections, needs for design modification may be in order. Planning should again take place through the winter and spring. The design may also need modification as the season approaches and occurs. A detailed, formalized operational plan, with specific procedures for each location should be prepared.

A daily sampling goal of 300-400 is a reasonable number for each crew to attempt. For this goal, a 3 person crew at each location along with one supervisor to cover both locations should suffice.

There is a need for improved communication capabilities between each location. This should be solved by each location having its own phone line installed for the season. At Sand Point, communication between the living quarters and the plant's dock and personnel should be improved with the addition of a base station VHF radio. This should also be considered at King Cove.

REFERENCES

- Alaska Department of Fish and Game Genetics Laboratory. 1994. Collection of Finfish Genetic Samples. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Anchorage, AK, 99518. 4 pp.
- McCullough, J. N., A. R. Shaul, R. D. Campbell, and R. S. Berceci. 1994. South Peninsula Annual Management Report, 1993. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report 4K94-38, Kodiak, AK, 99516. 230 pp.
- Sarafin, D. R., L. W. Seeb, and P. A. Crane. 1995. Chum Salmon Genetic Stock Identification: Baseline and Fishery Sample Collection, 1991-1993. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report 5J95-08, Anchorage, AK, 99518. 20 pp.

Table 1. South Unimak and Shumagin Islands June Fisheries, Chum Salmon GSI Samples by Date of Sampling, 1994.

Samples by Date¹ of Sampling

<u>June</u>	<u>Fishery</u>	<u>Shumagins</u>	<u>Fishery</u>	<u>S. Unimak</u>
9	Test	300	Closed	0
10	Test	300	Closed	0
11	Closed	0	Closed	0
12	Closed	0	Closed	0
13	Test	300	Test	*2
14	Test	300	Test	*2
15	Closed	0	Test	476 ² , *3
16	Closed	0	Test	*3
17	Test	300	Open	224 ³
18	Open	230	Open	400
19	Open	230	Open	110
20	Open	280	Open	330
21	Open	200	Open	180
22	Open	60	Open	44
23	Open	160	Open	206
24	Open	150	Open	120
25	Open	100	Open	100
26	Open	100	Open	100
27	Open	100	Open	100
28	Open	100	Open	100
29	Open	100	Open	80
30	Open	100	Open	160
7/1	Closed	0	Closed	120
7/2	Closed	30	Closed	0
Total		<u>3440</u>		<u>2850</u>

Overall June Fishery Total = 6290

¹ Date of sampling will vary from date of catch. Fish tickets will need to be reviewed to determine date of catch. (Test fish samples are listed by actual known date of catch).

² 476 sampled on 6/15 from Test Fish catch, primarily of 6/13 with possibly some mixed from 6/14.

³ 224 sampled on 6/17 from combined Test Fish catches of 6/15+16.

Table 2. South Unimak Fishery, Chum Salmon GSI Samples by Date of Sampling and Estimated Date of Catch, 1994.

SOUTH UNIMAK FISHERY
(King Cove)

<u>June</u>	<u>Fishery</u>	By Est.Date of Catch ¹	By Date Sampled ²
		<u>N</u>	<u>N</u>
9	Closed	0	0
10	Closed	0	0
11	Closed	0	0
12	Closed	0	0
13	Test	* ³	0
14	Test	476 ³	0
15	Test	* ⁴	476 ³
16	Test	224 ⁴	0
17	Open	400	224 ⁴
18	Open	110	400
19	Open	430	110
20	Open	80	330
21	Open	44	180
22	Open	206	44
23	Open	120	206
24	Open	100	120
25	Open	100	100
26	Open	100	100
27	Open	100	100
28	Open	140	100
29	Open	100	80
30	Open	120	160
7/1	Closed	0	0

King Cove Total= 2850

¹ Number of fish sampled by estimated date of catch. Calculated from rough inferences from period of open fishing and estimated time lapse throughout time of catch/tender pick-up/tender delivery. For more accurate date tracking, fish tickets must be reviewed.

² Number of fish sampled by actual date that sampling occurred.

³ 476 sampled on 6/15 from Test Fish catch, primarily of 6/13 with possibly some mixed from 6/14.

⁴ 224 sampled on 6/17 from combined Test Fish catches of 6/15+16.

Table 3. Shumagin Islands Fishery, Chum Salmon GSI Samples by Date of Sampling and Estimated Date of Catch, 1994.

SHUMAGIN FISHERY

(Sand Point)

<u>June</u>	<u>Fishery</u>	By Est.Date	By Date
		of Catch ¹	Sampled ²
		<u>N</u>	<u>N</u>
9	Test	300	300
10	Test	300	300
11	Closed	0	0
12	Closed	0	0
13	Test	300	300
14	Test	300	300
15	Closed	0	0
16	Closed	0	0
17	Test	300	300
18	Open	460	230
19	Open	280	230
20	Open	200	280
21	Open	60	200
22	Open	160	60
23	Open	150	160
24	Open	100	150
25	Open	100	100
26	Open	100	100
27	Open	100	100
28	Open	100	100
29	Open	100	100
30	Open	30	100
7/1	Closed	0	0
7/2	Closed	0	30

Sand Point Total= 3440

¹ Number of fish sampled by estimated date of catch. Calculated from rough inferences from period of open fishing and estimated time lapse throughout time of catch/tender pick-up/tender delivery. For more accurate date tracking, fish tickets must be reviewed.

² Number of fish sampled by actual date that sampling occurred.

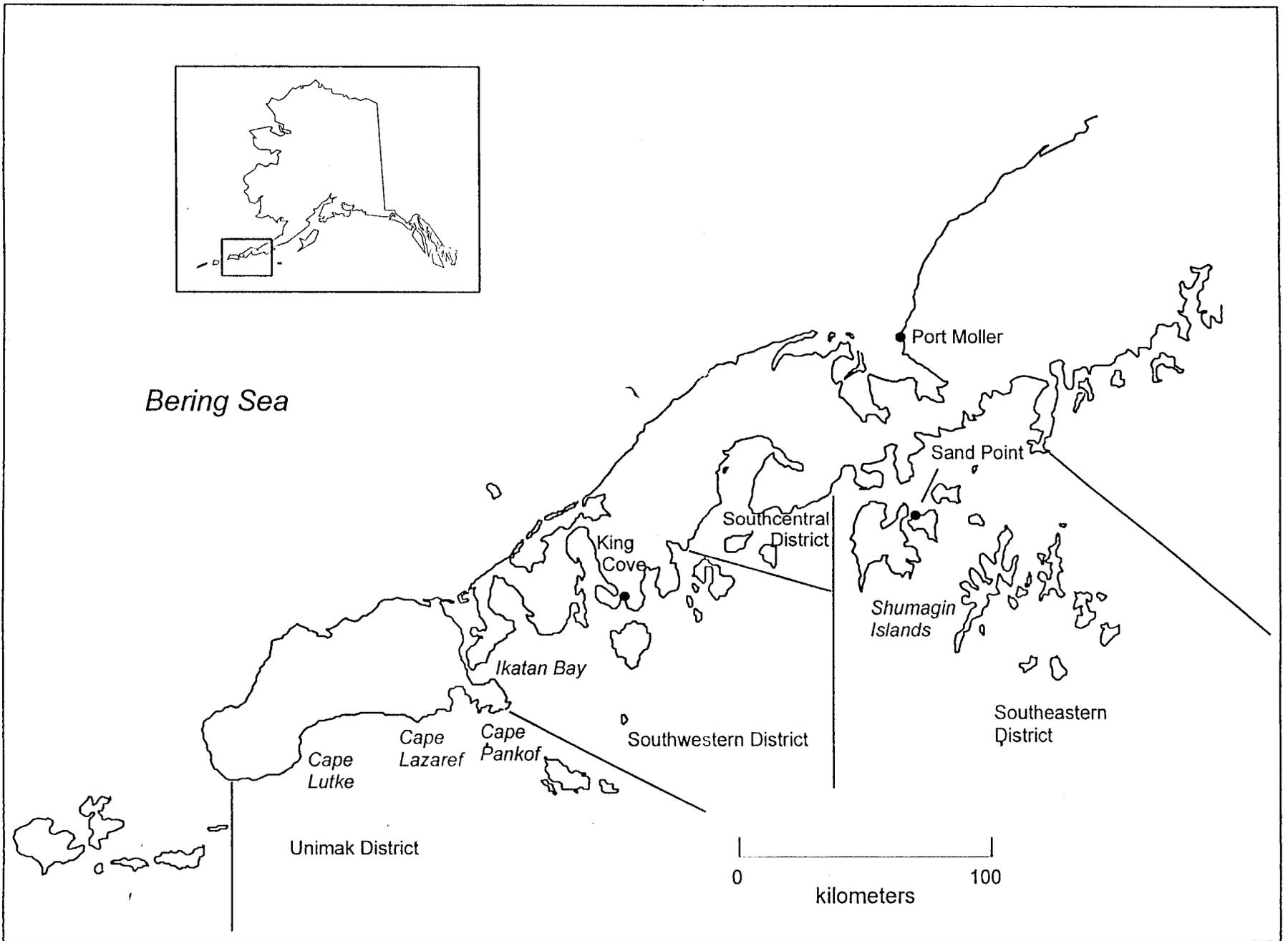


Figure 1. Map of South Alaska Peninsula Fishery Management Districts.

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